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CANONICAL CORRELATION OF A TEMPORAL LOBE SIGNS SCALE WITH SCHIZOID AND HYPOMANIA SCALES IN A NORMAL POPULATION: MEN AND WOMEN ARE SIMILAR BUT FOR DIFFERENT REASONS [1]

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Summary.—The relationships between four relevant Minnesota Multiphasic Personality Inventory variables and temporal lobe signs and symptoms were determined separately for 70 university men and 86 women. Canonical correlations were similar in magnitude (0.55 to 0.60) but indicated sex-specific construction of the roots. For men the significant variables were the schizoid and complex partial epileptic-like signs; for women the significant variables were hypomania and all three temporal lobe clusters: complex partial seizure experiences, interictal-like signs, and religious/psi phenomenology.

Increases in schizophreniform and hypomanic behaviors are primarily associated with microstructural damage or electrical disruption of the mesiobasal portions of the left or right (respectively) temporal lobes and their immediate orbitofrontal associations (1, 3, 14). Persinger (cf. 10) has pursued a statistical theory for the distribution of psychopathology in human populations. The model states that the syndromes of psychosis (schizophrenia and affective psychosis) and analogous personality disorders (schizotypal and cyclothymic clusters) are aggregates of symptoms that all *normal* adults display at least once in their lifetimes. However, the spatial (ratio of symptoms to the total behavioral pattern at any given interval) and the temporal (duration and persistence in behavioral time) characteristics would be less deviant from the centroid of the general population.

If this general premise is correct, then enhanced temporal lobe signs and symptoms displayed by normal adults should be associated with these two major domains (cognition and affect) of psychopathology. Secondly, given the sexual dimorphic organization of the mesiobasal temporal lobes (15), normal women should display more affective (than cognitive) indicators along the continuum of temporal lobe lability while men should display more anomalous cognitive indicators.

A total of 70 men and 86 women from two first-year psychology classes (1984, 1987) served as subjects; the means $\pm$ standard deviations for their ages were 22 ± 5 and 24 ± 7 years, respectively. Each subject was administered the Personal Philosophy Inventory (PPI) and the first 168 items of the MMPI (Minnesota Multiphasic Personality Inventory). Validity and clinical

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scaled scores were calculated (16). Three major temporal lobe clusters (numbers of yes responses divided by numbers of items per clusters x 100) were complex partial epileptic-like symptoms, interictal-like symptoms (8), and temporal lobe-relevant symptoms; a control cluster (15 items) was also identified (10). The means and standard deviations for these four clusters for the men were 28 and 16, 31 and 13, 35 and 10, and 75 and 13, respectively; for the women these cluster scores were 28 and 20, 35 and 16, 42 and 14, and 79 and 09, respectively. All statistical analyses were completed with SPSS^x software on a Vax 4000 computer.

Pearson correlations between each of the 10 clinical MMPI scales (all profiles were valid from clinical criteria) and the three temporal lobe-relevant and control clusters were significant only between paranoia (*Pa*), psychasthenia (*Pt*), schizophrenia (*Sc*), and hypomania (*Ma*). For men the strongest ($p <$ .01) correlations were between complex partial seizure-like signs and *Sc* (.45) and *Ma* (.44) only; for women the strongest correlations were evident between each of the three clusters of temporal lobe signs and *Ma* (.46 to .47) and *Sc* (.30 to .36). The means and *SD*s for these scales for the men and women were *Pa*: 63 ± 12 and 60 ± 10; *Pt*: 62 ± 10 and 59 ± 9; *Sc*: 67 ± 15 and 61 ± 10; and *Ma*: 66 ± 10 and 62 ± 11, respectively.

Multiple regression analyses were completed with each of the four clusters of the Personal Philosophy Inventory as dependent variables and the four MMPI variables as predictors. The multiple *R* values and predictor variables (order of entry, all positive slopes) for each of the PPI clusters for men and women, respectively, were CPES-like symptoms, $MR = 0.52$ (*Sc*, *Ma*), and 0.47 (*Ma*, *Sc*); interictal-like signs, $MR = .29$ (*Ma*) and .38 (*Ma*); temporal lobe relevant: no entry (male) and 0.52 (*Ma*, *Pt*); control cluster: no entries.

To check the maximum shared variance between these MMPI and PPI variables, canonical correlations (SPSS^x, MANOVA) were completed between these four scales and the four PPI cluster scores for men and women separately. Only the first roots of the four roots extracted were large and considered significant (explained more than 10% of the variance). For the men and the women, respectively, the correlations (structure coefficients) of each variable ($r > 0.49$, defined as significant) upon the first root ($CC = 0.63$, 0.55) were *Pt* (.47, .54), *Pa* (.37, .32), *Sc* (.86, .69), and *Ma* (.61, .92) for the variables and CPES (.85, .88), interictal-like (.30, .73), temporal lobe-relevant (.01, .90), and control (.20, .42) for the covariates. The variance extracted and the total (percentage) redundancy (respectively) were for men 0.37 and 15% and for women 0.43 and 12% on the MMPI variables and for men 0.21 and 8% and 0.57 and for women 17% on the PPI variables.

Canonical correlation verified the results of single zero-order bivariate analyses but explained only 10 to 15% additional variance compared to multiple regression of single variables. A primary variance matrix related non-

pathological manifestations of schizoid (creativity), hypomania (impulsivity, energy), and anxiety (vigilance) to temporal lobe signs. However, there was a clear sex difference in the diffusion of this matrix. For men, only complex partial seizure signs were associated with these personality variables; the unusual thinking measure dominated the impulsivity scale. For women, ictal, interictal, and temporal lobe-relevant signs (e.g., religiosity) were interrelated and associated with the personality variables; however, hypomania variance dominated the unusual thinking factor.

The pattern is commensurate with both general and experimental results. Anomalous thoughts and anomalous affect are commonly associated with dysfunction within the left and right temporal lobes, respectively. Involvement of the right, affective hemisphere would facilitate limbic-sensory hyperconnectionism (2), resulting in infusion of meaning and affect within several cognitive domains. The involvement of all of the temporal lobe clusters for women may help explain their increased fear but lowered egotism compared to men (11, 12).

The increased coherence of EEG activity between hemispheres for women relative to men (4) would facilitate greater and more frequent representation of right hemispheric processes, such as vigilance and its primary variants (fear and anxiety), within linguistic patterns. Because the sense of self and its awareness is strongly determined by left-hemispheric processes (5, 7), an organismic history of greater coherence would be expected to affect one's perception of the self and its capacity. Persinger and Makarec (13) have postulated that the normal enhancement of interhemispheric electrical coherence of the female brain would allow intermittent penetration of the right hemispheric-equivalent of the sense of self into awareness; phenomenologically, it could be experienced as a vague and sometimes uncomfortable sensed presence or other entity.

Normal men, because the incidence of interhemispheric coherence is relatively less frequent, would experience fewer intrusions. This could contribute to greater reliance upon the consistency of the self-concept and in its extreme form, greater egotism. Towards the psychiatric end of the continuum, schizophrenic-like (left-hemispheric) symptoms, dominated phenomenologically by anomalies in cognition and the boundaries of the sense of self, would be statistically more prevalent than hypomanic (right-hemispheric) episodes.

However, men who score within the upper quartile of temporal lobe signs, which is within the range of normal women, are more likely to display a female profile and less egotism (6). One would predict that these men would also display greater fearfulness, incidence of affective disorders, dependence upon intuitive styles for problem solving, more frequent sensed presences or mystical states, and interhemispheric coherence.

These results support the concept that the continuum of temporal lobe lability is associated with psychometric dimensions that allow inference of anomalies of cognition and affect; normal people who display more temporal lobe signs also report more of the experiences traditionally labeled as schizoid or hypomanic. The differential loading of these two dimensions upon our psychometric inferences of temporal lobe lability suggests that different cognitive styles, influenced primarily by gender, may be immersed within this continuum.

The likelihood that results are artifacts of the intercorrelations between the scales of the MMPI-168 is minimal. First, the same bias would have been prevalent for both sexes, yet differential loadings were apparent. Secondly, the strength of correlation and the specific MMPI and PPI scales associated are similar to those of a study in which the entire MMPI was administered (9). It should be emphasized that the indicators of temporal lobe lability from the PPI and the *Sc* and *Ma* scales of the MMPI share only 30% of their variance. If we assume that the PPI items are strongly representative of fundamental neuropsychological themes, then the majority of the variance from which we infer psychiatric factors is derived from other sources.

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